Search Algorithms in Python: Linear, Binary, and Other Types

1) Linear Search

- ♦ How it works:

  It goes through the list one element at a time and compares each element to the target.

  - ♦ Python code:
  - ♦ Time complexity = O (n)

    (It may go through the whole list if the target is at the end or not found at all)

2) Binary Search

- ♦ How it works:

  Works only on sorted lists. It repeatedly divides the list in half and checks which half the target is in.

  - ♦ Python code:
  - ♦ Time complexity = O (log n)

    (Much faster than linear search for large, sorted lists)

Other Search Algorithms (names + how they work)

1) Jump Search

- ♦ How it works:

Jump with fixed steps (ex. Every 3 elements) and when it finds that it has passed the target, it starts searching step by step in the previous block.

2) Interpolation Search

- ### How it works:

  It uses the estimated position of the target (based on the data distribution) to start searching from there. It is useful when the data is uniformly distributed.

3) Exponential Search

- ### How it works:

  It starts with index = 1 and keeps doubling it until it finds a value greater than the target. Then, it performs a Binary Search within that range.

4) Ternary Search

- ### How it works:

  It’s like Binary Search, but it divides the list into 3 parts instead of 2.

5) Fibonacci Search

- ### How it works:

  It’s like Binary Search, but it uses Fibonacci numbers to determine the division points.